Patent Claims

1. Diffuser sheet for LCD applications encompassing at least one light-scattering polymethyl methacrylate layer which comprises a polymethyl methacrylate matrix and also from 0.5 to 59.5% by weight, based on the weight of the light-scattering polymethyl methacrylate layer, of spherical scattering particles (A) whose median size V_{50} is in the range from 0.1 to 40 µm, and whose refractive index differs from that of the polymethyl methacrylate matrix by a value in the range from 0.02 to 0.2, and from 0.5 to 59.5% by weight, based on the weight of the light-scattering polymethyl methacrylate layer, of spherical particles (B) whose median size V_{50} is in the range from 10 to 150 µm and whose refractive index differs from that of the polymethyl methacrylate matrix by a value in the range from 0 to 0.2, where the total concentration of the spherical scattering particles (A) and particles (B) is in the range from 1 to 60% by weight, based on the weight of the light-scattering polymethyl methacrylate layer, and the spherical scattering particles (A) and spherical particles (B) have a different median particle size V_{50}, where the transmittance of the diffuser sheet is in the range from 20 to 70% and its scattering power is greater than 0.3, characterized in that the ratio of the square of average surface roughness of the polymethyl methacrylate layer R_z to the third power of the size of the spherical particles (B) R_z^2/D_{PB}^3 is in the range from 0.0002 to 0.1300 μm^{-1}.

2. Diffuser sheet according to Claim 1, characterized in that the ratio of the square of average surface roughness of the polymethyl methacrylate layer R_z to the third power of the size of the spherical

particles (B) R_z^2/D_{PB}^3 is in the range from 0.0009 to 0.0900 μm^{-1}.

3. Diffuser sheet according to Claim 1 or 2, characterized in that the ratio of concentration of the particles (B) c_{PB} to the thickness of the light-scattering polymethyl methacrylate layer d_S c_{PB}/d_S is greater than or equal to 2.5% by weight/mm.

4. Diffuser sheet according to any of the preceding claims, characterized in that the gloss R85° of the light-scattering polymethyl methacrylate layer is smaller than or equal to 40.

5. Diffuser sheet according to any of the preceding claims, characterized in that the ratio c_{PA} $*d_S/D_{PA}^3$ is in the range from 0.0025 to 0.3% by weight*mm/μm^2.

6. Diffuser sheet according to any of the preceding claims, characterized in that the ratio c_{PB} $*d_S/D_{PB}^3$ is in the range from 0.00005 to 0.02% by weight*mm/μm^2.

7. Diffuser sheet according to any of the preceding claims, characterized in that the thickness of the light-scattering polymethyl methacrylate layer is in the range from 1 to 10 mm.

8. Diffuser sheet according to any of the preceding claims, characterized in that the spherical particles (B) encompass crosslinked polystyrene, polysilicone and/or crosslinked poly(meth)-acrylates.

9. Diffuser sheet according to any of the preceding claims, characterized in that the scattering particles (A) encompass $BaSO_4$.

10. Diffuser sheet according to any of the preceding claims, characterized in that the matrix of the light-scattering polymethyl methacrylate layer has a refractive index in the range from 1.46 to 1.54, measured for the sodium D line (589 nm) and at 20°C.

11. Diffuser sheet according to any of the preceding claims, characterized in that the average surface roughness R_z of the sheet is in the range from 6 to 30 µm.

12. Diffuser sheet according to any of the preceding claims, characterized in that the median size V_{50} of the spherical particle (B) is greater by at least 5 µm than the median size of the scattering particles (A).

13. Diffuser sheet according to any of the preceding claims, characterized in that the median size V_{50} of the spherical scattering particles (A) is in the range from 2 to 15 µm.

14. Diffuser sheet according to any of the preceding claims, characterized in that the median size V_{50} of the spherical particles (B) is in the range from 15 to 70 µm.

15. Diffuser sheet according to any of the preceding claims, characterized in that scratches produced on the sheet using a force of at most 0.7 N are not visually detectable.

16. Diffuser sheet according to any of the preceding claims, characterized in that the long-term service temperature of the sheet is at least 60°C.

17. Diffuser sheet according to any of the preceding claims, characterized in that the modulus of elasticity of the sheet is at least 2000 MPa.

18. Diffuser sheet according to any of the preceding claims, characterized in that the longitudinal expansion of the sheet due to heating by at least 20°C is at most 5%.

19. Diffuser sheet according to any of the preceding claims, characterized in that the weathering resistance of the sheet to DIN 53 387 is at least 5000 hours.

20. Diffuser sheet according to any of the preceding claims, characterized in that the transmittance of the sheet is in the range from 40 to 65%.

21. Diffuser sheet according to any of the preceding claims, characterized in that the yellowness index of the sheet is smaller than or equal to 12.

22. Diffuser sheet according to any of the preceding claims, characterized in that the halved-intensity angle of the sheet is greater than or equal to 15°.

23. Diffuser sheet according to any of the preceding claims, characterized in that the scattering power of the sheet is greater than or equal to 0.45.

24. Process for producing a diffuser sheet according to any of Claims 1 to 23, characterized in that a moulding composition encompassing polymethyl methacrylate, spherical scattering particles (A) and spherical particles (B) is extruded.

25. Use of a diffuser sheet according to any of Claims 1 to 23 in optical applications.

26. Use according to Claim 25 as rear-projection screen.